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Sinha 15-41

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s): D. Sinha et al.
Case: 15-41
Serial No.: 09/454,027
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Group: 2697
Examiner: Andrew R. Graham

Title: Multidescriptive Coding Technique for Multistream Communication of Signals

APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
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Sir:

Applicants hereby appeal the final rejection dated October 8, 2003 of claims 1-46 of the above-identified application.

REAL PARTY IN INTEREST

The present application is assigned to Agere Systems Inc. The assignee Agere Systems Inc. is the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals and interferences.

STATUS OF CLAIMS

The present application was filed on December 3, 1999 with claims 1-46. The present application claims priority to a provisional application filed April 29, 1999.

Claims 1-46 are currently pending in the application. Claims 1, 8, 19, 25, 32 and 43 are the independent claims.

Claims 1-8, 13-21, 25-32 and 37-45 stand finally rejected under 35 U.S.C. §102(e), and claims 9-12, 22-24, 33-36 and 46 stand finally rejected under 35 U.S.C. §103(a). Claims 1-46 are appealed.

STATUS OF AMENDMENTS

There have been no amendments filed subsequent to the final rejection.

SUMMARY OF INVENTION

The present invention is directed to arrangements for communicating or recovering a signal that has at least first and second components, utilizing first and second representations of the signal. The first representation contains first information concerning at least the first component, and second information concerning at least one coefficient for predicting the second component based on the first information. The second representation contains third information concerning at least the second component, and fourth information concerning at least one coefficient for predicting the first component based on the third information.

An illustrative embodiment of the invention shown in FIG. 1 of the drawings is in the form of a digital audio broadcast (DAB) system 100 comprising a control station 103, satellites 107a and 107b, and a mobile receiver 105. A transmitter 201 in the control station 103 is shown in FIG. 2, and includes a multidescriptive coder 203. The multidescriptive coder 203 generates the above-noted first and second representations, more specifically referred to in this embodiment as D1 and D2 representations, respectively. The D1 representation contains: (i) information concerning a left channel signal L of an analog stereo audio signal, and (ii) parametric information concerning a right channel signal R of the analog stereo audio signal. The D2 representation in this embodiment contains: (i) information concerning R, and (ii) parametric information concerning L. The D1 and D2 representations are transmitted from the control station 103 to the mobile unit 105 through

respective satellite links 112 and 115. See the specification at, for example, page 5, line 13 to page 6, line 25.

A significant advantage of the claimed arrangements is that they allow multidescriptive representations of a given signal to be transmitted over multiple channels in a bandwidth-efficient manner, such that recovered signal quality is a function of the particular number of multidescriptive representations that are received. See the specification at, for example, page 2, lines 16-23, page 3, lines 9-23, and page 5, lines 4-12.

ISSUES PRESENTED FOR REVIEW

1. Whether claims 1-8, 13-21, 25-32 and 37-45 are anticipated under 35 U.S.C. §102(e) by U.S. Patent No. 6,360,200 (hereinafter "Edler").

2. Whether claims 9-12 and 33-36 are unpatentable under 35 U.S.C. §103(a) over Edler in view of U.S. Patent No. 5,832,379 (hereinafter "Mallinckrodt").

3. Whether claims 22-24 and 46 are unpatentable under §103(a) over Edler in view of allegedly admitted prior art.

GROUPING OF CLAIMS

With regard to Issue 1, claims 1-3, 8, 13, 14, 19-21, 25-27, 32, 37, 38 and 43-45 stand or fall together, claims 4, 15, 28 and 39 stand or fall together, claims 5, 16, 29 and 40 stand or fall together, claims 6, 17, 30 and 41 stand or fall together, and claims 7, 18, 31 and 42 stand or fall together.

With regard to Issue 2, claims 9 and 33 stand or fall together, claims 10 and 34 stand or fall together, claims 11 and 35 stand or fall together, and claims 12 and 36 stand or fall together.

With regard to Issue 3, claims 22, 23 and 46 stand or fall together, and claim 24 stands or falls alone.

ARGUMENT

Issue 1

Applicants initially note that the Manual of Patent Examining Procedure (MPEP), Eight Edition, August 2001, §2131, specifies that a given claim is anticipated "only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference," citing Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, MPEP §2131 indicates that the cited reference must show the "identical invention . . . in as complete detail as is contained in the . . . claim," citing Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

For the reasons identified below, Applicants submit that the Examiner has failed to establish anticipation of at least independent claims 1, 8, 19, 25, 32 and 43 by the Edler reference.

Each of independent claims 1, 8, 19, 25, 32 and 43 includes limitations relating to the communication of first and second representations of a signal that includes a first component and a second component. The first representation contains first information concerning at least the first component, and second information concerning at least one coefficient for predicting the second component based on the first information. The second representation contains third information concerning at least the second component, and fourth information concerning at least one coefficient for predicting the first component based on the third information.

As mentioned previously, in the context of an example of an illustrative embodiment of the invention falling within the above-noted limitations, the first and second representations are referred to as D1 and D2 representations, respectively. The D1 representation in this embodiment contains: (i) information concerning a left channel signal L of an analog stereo audio signal, and (ii) parametric information concerning a right channel signal R of the analog stereo audio signal. The D2 representation in this embodiment contains: (i) information concerning R, and (ii) parametric information concerning L. See the specification at, for example, page 5, line 24 to page 6, line 25. It should be noted that this example is presented herein in order to illustrate one possible embodiment of the invention that falls within the above-noted claim limitations. Applicants are not suggesting that any of the claims include as limitations the particular features of this illustrative embodiment.

Applicants respectfully submit that the Edler reference fails to teach or suggest the above-noted limitations of the independent claims relating to first and second representations of a signal that includes a first component and a second component.

The Examiner in formulating the §102(e) rejection argues that a dual-channel stereo version of the Edler encoding system utilizing predictor circuit 43 of FIG. 1 meets these limitations. More particularly, the Examiner in effect argues that the first and second components of the signal referred to in the claims correspond to the respective left and right channel signals $x_l(n)$ and $x_r(n)$ in FIG. 1a of Edler, and that the first and second representations of the signal correspond to the respective prediction error signals $\tilde{e}_l(n)$ and $\tilde{e}_r(n)$ at the output of the encoder in FIG. 1a.

Contrary to the implication that the Examiner attempts to draw at page 12, last paragraph, of the final Office Action, Applicants do not agree in any way that this correspondence is correct. However, if one were to assume, <u>for purposes of argument only</u>, that this alleged correspondence between the claim elements and elements of Edler is correct, <u>other aspects of the claim limitations are then clearly not met</u>. The fact that other aspects of the claim limitations are not met serves as an indication that the correspondence alleged by the Examiner is actually incorrect. For example, the prediction error signal $\tilde{e}_l(n)$ in FIG. 1a is not described in Edler as containing separately-identifiable pieces of information, namely, first information concerning at least the first component and second information concerning at least one coefficient for predicting the second component based on the first information. Applicants submit that there is no such separately-identifiable first and second information in the prediction error signal $\tilde{e}_l(n)$. Similarly, the prediction error signal $\tilde{e}_r(n)$ in FIG. 1a is not described in Edler as containing separately-identifiable pieces of information, namely, third information concerning at least the second component, and fourth information concerning at least one coefficient for predicting the first component based on the third information. Again, Applicants submit that there is no such separately-identifiable third and fourth information in the prediction error signal $\tilde{e}_r(n)$.

The position of Applicants as outlined above is made further apparent from the fact that the prediction error signals $\tilde{e}_l(n)$ and $\tilde{e}_r(n)$ in FIG. 1a of Edler are not denoted therein as vectors, but

are instead apparently one-dimensional signals, each having only a single identifiable information component for a given instance of the sampling time *n*.

The Examiner at page 13, first full paragraph, of the final Office Action argues that the claims do not require "separately-identifiable pieces" of information in the first and second representations. However, the claims specify that the first representation contains first information concerning at least the first component, and second information concerning at least one coefficient for predicting the second component based on the first information. Since the claims thus require that the first representation contains both first information and second information, and that the first and second information have different characteristics relative to one another, the claims in effect specify that the first information and the second information are separately identifiable as such within the first representation. Similarly, the claims specify that the second representation contains third information concerning at least the second component, and fourth information concerning at least one coefficient for predicting the first component based on the third information. Since the claims thus require that the second representation contains both third information and fourth information, and that the third and fourth information have different characteristics relative to one another, the claims in effect specify that the third information and the fourth information are separately identifiable as such within the second representation.

The Examiner, in attempting to argue anticipation without showing a first representation that contains both first information and second information as claimed, and a second representation that contains both third information and fourth information as claimed, is failing to give appropriate patentable weight to all claim limitations. This is improper.

The Examiner attempts to justify this failure to give appropriate patentable weight to all claim limitations by arguing on page 13, first full paragraph, of the final Office Action that the limitations in question are met because Edler is able "to obtain the same prediction output signal from the transmitted signal." Again, even if were to assume, for purposes of argument only, that this characterization of Edler is correct, it does not relieve the Examiner from the burden of showing that "each and every element" of a given claim is disclosed in Edler.

With regard to the use of vector notation in Edler, Applicants note that Edler explicitly uses vector notation to describe certain signals, in column 4, lines 3-24, but in the associated equations

shows the N-channel generalized case of the prediction error signals $\tilde{e}_l(n)$ and $\tilde{e}_r(n)$ as one-dimensional elements of such vector signals. This strongly suggests that the prediction error signals $\tilde{e}_l(n)$ and $\tilde{e}_r(n)$ in Edler are not vector signals.

In view of the foregoing, Applicants respectfully submit that Edler fails teach or suggest each and every element of each of the independent claims, in as complete detail as is contained in those claims, as is required by MPEP §2131.

Since Edler fails to teach or suggest the limitations of each of independent claims 1, 8, 19, 25, 32 and 43, these claims are not anticipated by Edler.

Dependent claims 2-7, 13-18, 20, 21, 26-31, 37-42, 44 and 45 are believed allowable for at least the reasons identified above with regard to their respective independent claims. Moreover, certain of these dependent claims are believed to define separately-patentable subject matter, as will be described in greater detail below.

With regard to claims 4, 15, 28 and 39, these claims specify that the first information contained in the first representation concerns a combination of the first component and the second component of the given signal. The Examiner relies on operations performed by the adders 49, 51 and 54 in FIG. 5 of Edler. However, these relied-upon adders do not generate first information of a first representation of a given signal, where the first representation also includes second information concerning at least one coefficient for predicting the second component based on the first information, as required by the claim. Edler therefore fails to anticipate the limitation in question.

With regard to claims 5, 16, 29 and 40, these claims specify that the combination of the first component and the second component in the first information is adaptively determined. An example of such an arrangement is described in the specification at, for example, page 13, line 32, to page 14, line 18, and utilizes adapter 211 shown in FIG. 2 of the drawings. The predictor circuitry 43 of Edler, relied upon by the Examiner, does not perform any such adaptive combination of first and second components in first information of a first representation of a given signal. Edler therefore fails to anticipate the limitation in question.

With regard to claims 6, 17, 30 and 41, these claims specify that the third information contained in the second representation concerns a combination of the first component and the second

component of the given signal. The Examiner again relies on operations performed by the adders 49, 51 and 54 in FIG. 5 of Edler. However, these relied-upon adders do not generate third information of a second representation of a given signal, where the second representation also includes fourth information concerning at least one coefficient for predicting the first component based on the third information, as required by the claim. Edler therefore fails to anticipate the limitation in question.

With regard to claims 7, 18, 31 and 42, these claims specify that the combination of the first component and the second component in the third information is adaptively determined. An example of such an arrangement is described in the specification at, for example, page 13, line 32, to page 14, line 18, and utilizes adapter 211 shown in FIG. 2 of the drawings. The predictor circuitry 43 of Edler, relied upon by the Examiner, does not perform any such adaptive combination of first and second components in third information of a second representation of a given signal. Edler therefore fails to anticipate the limitation in question.

Issue 2

Dependent claims 9-12 and 33-36 are believed allowable for at least the reasons identified above with regard to their respective independent claims 8 and 32. Also, certain of these claims are believed to define separately-patentable subject matter relative to the proposed combination of Edler and Mallinckrodt, as will be described in greater detail below.

The arguments presented above with regard to independent claims 8 and 32 are realleged and incorporated herein by reference.

The Mallinckrodt reference fails to supplement the above-noted fundamental deficiencies of Edler as applied to independent claims 8 and 32.

Applicants further note that a proper *prima facie* case of obviousness requires that the cited references when combined must "teach or suggest all the claim limitations," and that there be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the references or to modify the reference teachings. See MPEP, Eighth Edition, August 2001, §706.02(j).

Applicants submit that the Examiner has failed to establish a proper *prima facie* case of obviousness in the present §103(a) rejection, in that the Edler and Mallinckrodt references, even if

assumed to be combinable, fail to teach or suggest all the claim limitations, and in that no cogent motivation has been identified for combining the Edler and Mallinckrodt references or modifying the reference teachings to reach the claimed invention.

The Federal Circuit has stated that when patentability turns on the question of obviousness, the obviousness determination "must be based on objective evidence of record" and that "this precedent has been reinforced in myriad decisions, and cannot be dispensed with." In re Sang-Su Lee, 277 F.3d 1338, 1343 (Fed. Cir. 2002). Moreover, the Federal Circuit has stated that "conclusory statements" by an examiner fail to adequately address the factual question of motivation, which is material to patentability and cannot be resolved "on subjective belief and unknown authority." Id. at 1343-1344.

There has been no showing in the present §103(a) rejection of objective evidence of record that would motivate one skilled in the art to combine the Edler and Mallinckrodt references or to modify the proposed combination of references to produce the particular limitations in question.

With regard to motivation to combine Edler and Mallinckrodt, the Examiner provides the following statement at page 8, last paragraph, to page 9, first paragraph, of the final Office Action, with emphasis supplied:

> To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include a signal quality monitoring and compensation system as taught by Mallinckrodt in the decoder component of the system of Edler. The motivation behind such a modification would have been that such a selection scheme would have provided an intelligent, structured approach to constructing the best possible representation of an original input audio system.

Applicants submit that this passage fails to provide the requisite motivation for the proposed combination. The above-quoted statement of obviousness given by the Examiner in the final Office Action is believed to be precisely the type of subjective, conclusory statement that the Federal Circuit has indicated provides insufficient support for an obviousness rejection. It appears, in view of the above-quoted conclusory statement of obviousness provided by the Examiner, that the Examiner in combining Edler and Mallinckrodt has simply undertaken a hindsight-based piecemeal

reconstruction of the claimed invention based on the disclosure provided by Applicants. Such an approach is improper.

As indicated above, Applicants also believe that certain of claims 9-12 and 33-36 define separately-patentable subject matter relative to the proposed combination of Edler and Mallinckrodt.

With regard to claims 9 and 33, these claims specify that the at least one of the first representation and the second representation is selected based on a measure of corruption of the selected representation. The proposed combination of Edler and Mallinckrodt fails to meet this limitation. The collective teachings of the references fail to disclose any type of selection between first and second representations of a given signal.

With regard to claims 10 and 34, these claims specify that the first representation and the second representation are encoded in accordance with a forward error correction coding technique. It is again important to note that the first and second representations are representations of the same signal. The "two shown sources of audio input" referred to by the Examiner are different signals, and cannot be viewed as first and second representations of the same signal as claimed. Moreover, the Examiner relies on elements 114, 156 of FIG. 7 of Mallinckrodt, calling both such elements "forward error encoders." It is believed that this is an incorrect characterization of the reference, in that FIG. 7 clearly indicates that element 156 is a forward error decoder, rather than a forward error encoder. The proposed combination of Edler and Mallinckrodt therefore fails to meet the limitation in question.

With regard to claims 11 and 35, these claims specify that the measure used to select at least one of the first representation and the second representation is a function of a count of detections of errors in the selected representation, in accordance with the forward error correction coding technique. As indicated above, the collective teachings of the references fail to disclose any type of selection between first and second representations of a given signal. The proposed combination of Edler and Mallinckrodt therefore fails to meet the limitation in question.

With regard to claims 12 and 36, these claims specify that the first representation and the second representation are received from a plurality of respective communication channels, and that the measure used to select at least one of the first representation and the second representation is a function of a signal-to-interference ratio afforded by the communication channel from which the selected representation is received. Applicants again wish to emphasize that the first and second

representations are representations of the same signal, and that the collective teachings of the references fail to disclose any type of selection between first and second representations of a given signal. The proposed combination of Edler and Mallinckrodt therefore fails to meet the limitation in question.

Issue 3

Dependent claims 22-24 and 46 are believed allowable for at least the reasons identified above with regard to their respective independent claims 19 and 43. At least dependent claim 24 is also believed to define separately-patentable subject matter, as will be described in greater detail below.

The arguments presented above with regard to independent claims 19 and 43 are realleged and incorporated herein by reference.

The allegedly admitted prior art fail to supplement the above-noted fundamental deficiencies of Edler as applied to the independent claims.

With regard to dependent claim 24, this claim specifies that a third representation of the signal is transmitted through a selected one of the communication channels, where the selected channel includes a terrestrial link, and the communication channels also include satellite links. An example of such an arrangement is described in the specification at, for example, page 4, lines 4-23, and page 5, lines 24-28. The Examiner argues that the limitations of claim 24 are obvious in view of a combination of Edler and allegedly admitted prior art. However, the proposed combination does not make any reference whatsoever to a third representation of a signal, nor the transmission of such a third representation over a terrestrial link in a set of channels that include satellite links that may be carrying first and second representations of the same signal. Thus, the combined teachings of Edler and the allegedly admitted prior art fail to meet the particular limitations of dependent claim 24.

In view of the above, Applicants believe that claims 1-46 are in condition for allowance, and respectfully request withdrawal of the §102(e) and §103(a) rejections.

Respectfully submitted,

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APPENDIX

1. Apparatus for communicating a signal over a plurality of communication channels, the signal including at least a first component and a second component, the apparatus comprising:

a processor for generating at least a first representation and a second representation of the signal, the first representation containing first information concerning at least the first component, and second information concerning at least one coefficient for predicting the second component based on the first information, the second representation containing third information concerning at least the second component, and fourth information concerning at least one coefficient for predicting the first component based on the third information; and

an output device for transmitting the first representation and the second representation through the communication channels.

2. The apparatus of claim 1 wherein the signal includes a stereo audio signal.

3. The apparatus of claim 2 wherein the first component includes a left channel signal of the stereo audio signal, and the second component includes a right channel signal thereof.

4. The apparatus of claim 1 wherein the first information concerns a combination of the first component and the second component.

5. The apparatus of claim 4 wherein the combination of the first component and the second component is adaptively determined.

6. The apparatus of claim 1 wherein the third information concerns a combination of the first component and the second component.

7. The apparatus of claim 6 wherein the combination of the first component and the second component is adaptively determined.

8. Apparatus for recovering a signal including at least a first component and a second component, the apparatus comprising:

a receiver for receiving at least a first representation and a second representation of the signal, the first representation containing first information concerning at least the first component, and second information concerning at least one coefficient for predicting the second component based on the first information, the second representation containing third information concerning at least the second component, and fourth information concerning at least one coefficient for predicting the first component based on the third information; and

a processor for selecting use of at least one of the first representation and the second representation to recover the signal.

9. The apparatus of claim 8 wherein the at least one of the first representation and the second representation is selected based on a measure of corruption of the selected representation.

10. The apparatus of claim 9 wherein the first representation and the second representation are encoded in accordance with a forward error correction coding technique.

11. The apparatus of claim 10 wherein the measure is a function of a count of detections of errors in the selected representation, in accordance with the forward error correction coding technique.

12. The apparatus of claim 9 wherein the first representation and the second representation are received from a plurality of communication channels, respectively, the measure being a function of a signal-to-interference ratio afforded by the communication channel from which the selected representation is received.

13. The apparatus of claim 8 wherein the signal includes stereo audio signal.

14. The apparatus of claim 13 wherein the first component includes a left channel signal of the stereo audio signal, and the second component includes a right channel signal thereof.

15. The apparatus of claim 8 wherein the first information concerns a combination of the first component and the second component.

16. The apparatus of claim 15 wherein the combination of the first component and the second component is adaptively determined.

17. The apparatus of claim 8 wherein the third information concerns a combination of the first component and the second component.

18. The apparatus of claim 17 wherein the combination of the first component and the second component is adaptively determined.

19. A system for communicating a signal which includes at least a first component and a second component, the system comprising:

a plurality of communication channels;

a transmitter for transmitting at least a first representation and a second representation of the signal through the communication channels, the first representation containing first information concerning at least the first component, and second information concerning at least one coefficient for predicting the second component based on the first information, the second representation containing third information concerning at least the second component, and fourth information concerning at least one coefficient for predicting the first component based on the third information; and

a receiver for recovering the signal based on at least a selected one of the first representation and the second representation.

20. The system of claim 19 wherein the signal includes a stereo audio signal.

21. The system of claim 20 wherein the first component includes a left channel signal of the stereo audio signal, and the second component includes a right channel signal thereof.

22. The system of claim 19 wherein the communication channels are simultaneously available for transmitting the first representation and the second representation therethrough, respectively.

23. The system of claim 19 wherein the communication channels include satellite links.

24. The system of claim 23 wherein a third representation of the signal is transmitted through a selected one of the communication channels, the selected channel includes a terrestrial link.

25. A method for communicating a signal over a plurality of communication channels, the signal including at least a first component and a second component, the method comprising:

generating at least a first representation and a second representation of the signal, the first representation containing first information concerning at least the first component, and second information concerning at least one coefficient for predicting the second component based on the first information, the second representation containing third information concerning at least the second component, and fourth information concerning at least one coefficient for predicting the first component based on the third information; and

transmitting the first representation and the second representation through the communication channels.

26. The method of claim 25 wherein the signal includes a stereo audio signal.

27. The method of claim 26 wherein the first component includes a left channel signal of the stereo audio signal, and the second component includes a right channel signal thereof.

28. The method of claim 25 wherein the first information concerns a combination of the first component and the second component.

29. The method of claim 28 wherein the combination of the first component and the second component is adaptively determined.

30. The method of claim 25 wherein the third information concerns a combination of the first component and the second component.

31. The method of claim 30 wherein the combination of the first component and the second component is adaptively determined.

32. A method for recovering a signal including at least a first component and a second component, the method comprising:

receiving at least a first representation and a second representation of the signal, the first representation containing first information concerning at least the first component, and second information concerning at least one coefficient for predicting the second component based on the first information., the second representation containing third information concerning at least the

second component, and fourth information concerning at least one coefficient for predicting the first component based on the third information; and

selecting use of at least one of the first representation and the second representation to recover the signer.

33. The method of claim 32 wherein the at least one of the first representation and the second representation is selected based on a measure of corruption of the selected representation.

34. The method of claim 33 wherein the first representation and the second representation are encoded in accordance with a forward error correction coding technique.

35. The method of claim 34 wherein the measure is a function of a count of detections of errors in the selected representation, in accordance with the forward error correction coding technique.

36. The method of claim 33 wherein the first representation and the second representation are received from a plurality of communication channels, respectively, the measure being a function of a signal-to-interference ratio afforded by the communication channel from which the selected representation is received.

37. The method of claim 32 wherein the signal includes a stereo audio signal.

38. The method of claim 37 wherein the first component includes a left channel signal of the stereo audio signal, and the second component includes a right channel signal thereof.

39. The method of claim 32 wherein the first information concerns a combination of the first component and the second component.

40. The method of claim 39 wherein the combination of the first component and the second component is adaptively determined.

41. The method of claim 32 wherein the third information concerns a combination of the first component and the second component.

42. The method of claim 41 wherein the combination of the first component and the second component is adaptively determined.

43. A method for communicating a signal over a plurality of communications channels, the signal including at least a first component and a second component, the method comprising:

transmitting at least a first representation and a second representation of the signal through the communication channels, the first representation containing first information concerning at least the first component, and second information concerning at least a first coefficient for predicting the second component based on the first information, the second representation containing

third information concerning at least the second component, and fourth information concerning at least a second coefficient for predicting the first component based on the third information; and

recovering the signal based on at least a selected one of the first representation and the second representation.

44. The method of claim 43 wherein the signal includes a stereo audio signal.

45. The method of claim 44 wherein the first component includes a left channel signal of the stereo audio signal, and the second component includes a right channel signal thereof.

46. The method of claim 43 wherein the communication channels are simultaneously available for transmitting the first representation and the second representation therethrough, respectively.